

REMARKS

In the present Office Action, claims 1-28 were examined. Claims 1-12 are rejected, no claims are objected to, and no claims are allowed. In the present amendment, claims 1, 6 and 8 have been amended and claims 2, 7 and 13-28 have been canceled. No new claims are presented. Applicants submit that no new matter is added by this amendment. By this Amendment, claims 1, 3-6, and 8-12 are believed to be in condition for allowance.

Rejections/Objections under 35 USC §112

The Examiner rejected claims 1 and 6 under 35 U.S.C. §112, first paragraph. Specifically, the Examiner states that the phrase “an amount of oxygen in said metal oxide is maximized” is vague and indefinite. Applicants herein amend claims 1 and 6 to remove the above-mentioned phrase. Accordingly, Applicants submit the present rejection has been overcome and respectfully request the Examiner withdraw the rejection.

The Examiner rejected claims 1 and 6 under 35 U.S.C. §112, second paragraph. Specifically, the Examiner states that the phrase “an amount of oxygen in said metal oxide is maximized” is vague and indefinite. Based on the amendments to claims 1 and 6 discussed in more detail above, Applicants respectfully submit this rejection has been overcome and request the Examiner withdraw the present rejection.

Rejections under 35 USC §102

The Examiner rejected claims 1, 3, 5, 6 and 10-12 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,071,520 to Lin et al. Specifically, the Examiner states Lin et al. discloses a copper base foil having an anti-tarnish coating for improving metal strength. Further the Examiner states the anti-tarnish coating of Lin et al. resembles the peel strength enhancement coating of the present invention.

To clarify the claimed invention, Applicants herein amend claims 1 and 6 to recite that the copper foil is smooth. Support for this amendment can be found at least at pages 5-9 of the present specification, and currently canceled claims 2 and 7. Note the definition of the term “smooth” is provided on page 5 of the specification, which states “[t]he term ‘smooth’, as used herein means a low profile surface, e.g., less than $1\mu\text{m}$ Rz, where Rz is the average of five peak to valley distance measurements using a surface profilometer.” Applicants submit Lin et al. does not disclose or suggest either explicitly or inherently, a smooth copper foil. Accordingly, Applicants submit the present rejection has been overcome and respectfully requests the Examiner withdraw the rejection.

Rejections under 35 USC §103

The Examiner rejected claims 1-12 under 35 U.S.C. §103(a) as being obvious and unpatentable in view of Lin et al. Specifically, the Examiner states Lin teaches the concept of the present invention but is silent about the surface of the copper being smooth and is silent about the thickness of the peel strength enhancement coating. The Examiner takes the position that in view of Lin’s teaching, one of skill in the art would choose the surface condition of the copper foil and the thickness of the peel enhancement coating because they are just a matter of design choice. Applicants respectfully disagree with the Examiner.

As recited in amended claims 1 and 6, the copper foil of the present invention is smooth. The term smooth has been defined in the present specification at page 5 to mean a low profile surface, e.g. less than $1\mu\text{m}$ Rz. In contrast, Lin et al. disclose an electrodeposited copper foil provided with an antitarnish coating. The peel strength of the electrodeposited copper foil was shown to increase after rinsing in a solution containing silane.

Applicants submit the copper foil disclosed in Lin et al. is inherently rough. The Applicants refer to Examples A – E, which state the copper foil is electrodeposited. Applicants submit that the term “electrodeposited” as used in Lin et al. and as understood by those skilled in the art indicates the copper foil is rough. (See also “Printed Circuit Board Materials Handbook”, McGraw-Hill, 1997, page 7.6, copy enclosed herein.) The roughness of the copper foil in Lin et al. is further highlighted in Examples A, B, C, and E, which disclose that the copper foil is

subjected to a dendritic treatment. Applicants submit that dendritic treatment of copper foil results in a copper foil having a rough surface. Accordingly, Applicants respectfully submit that the Lin et al. reference actually teaches away from the present invention as it teaches the use of an electrodeposited, i.e. a rough, copper foil.

Further, Applicants submit that the copper foil subjected to the peel strength enhancement of the present invention has a different structure, i.e. morphology, than the copper foil disclosed in Lin et al. To support this position, Applicants herein submit photographs from a scanning electron microscope taken by the Applicants in September, 2005. The first picture, indicated as "Sample 1" shows the morphology of the copper foil described in Example A of Lin et al. The second picture, indicated as "Sample 2" shows the morphology of the copper foil and peel strength enhancement layer of the present invention. (See attached Affidavit of William L. Brenneman protocols used to obtain Sample 1 and Sample 2). As stated in the attached Affidavit, the photograph of Sample 1 exhibits a different surface morphology, shown by the small light dots in the photograph. In contrast, the copper foil in the Sample 2 photograph does not exhibit the small light dots. Accordingly, these photographs further support Applicants' position that the copper foil of the present invention differs from and is not inherently disclosed or taught by Lin et al. Therefore, Applicants respectfully submit the present rejection has been overcome and requests the current rejection be withdrawn.

Double Patenting Rejection

Claims 1-4 and 6-11 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of U.S. Patent No. 6,346,335. To overcome the present rejection, Applicants herein submit a terminal disclaimer disclaiming the terminal part of any patent granted on the present application which would extend beyond the normal expiration of U.S. Patent No. 6,346,335.

Both the present application and U.S. Patent No. 6,346,335 are assigned to Olin Corporation. Accordingly, Applicants submit that the present rejection has been overcome and respectfully request the Examiner withdraw the double patenting rejection.

Accordingly, Applicants submit that none of the references, either alone or in combination, anticipate or make obvious the invention as presently claimed and that the application is now in condition for allowance. Therefore, Applicants respectfully request reconsideration and further examination of the application and the Examiner is respectfully requested to take such proper actions so that a patent will issue herefrom as soon as possible.

If the Examiner has any questions or believes that a discussion with Applicants' attorney would expedite prosecution, the Examiner is invited and encouraged to contact the undersigned at the telephone number below.

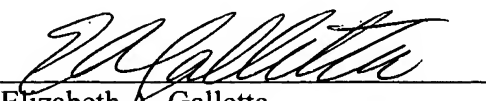
NOTICE OF APPEAL

While Applicants believe that the amended claims are in condition for allowance, should the Examiner maintain his rejection of the pending claims, a Notice of Applicants' Appeal of that rejection is appended.

Please apply any credits or charge any deficiencies to our Deposit Account No. 23-1665.

Respectfully submitted,
William L. Brenneman, et al.

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